

REMARKS

Claims **1-20** are pending. By this amendment, claims **21 - 35** have been canceled.

Reconsideration and timely withdrawal of the pending rejections is requested for the reasons set forth below.

Restriction Requirement

The Examiner required restriction on the basis of MPEP § 806.05(d) between Group I, directed to claims 1-20, and Group II, directed to claims 21-35. As noted by the Examiner, Applicants have provisionally elected without traverse the invention of Group I and hereby affirm this election. Applicants additionally note that this basis of restriction has been rendered moot because non-elected claims 21-35 have been canceled.

Objection to the Claims

Claims 1-20 have been objected to because the claims are not numbered in Arabic numerals. Applicants respectfully disagree with this basis of objection. Applicants submits that the instant application was filed with claims numbered with Arabic numerals. Applicants also note that the instant amendment to the claims clearly uses Arabic numerals in the claims. Accordingly, Applicants respectfully request that this basis of objection be withdrawn.

Claim 16 was also objected to because it was asserted to contain a period at the beginning of the claim. Applicants respectfully disagree with this basis of objection. Applicants submits that the instant application was filed with claim 16 in proper form. Applicants also note that the instant amendment to the claims clearly presents claim 16 in proper form. Accordingly, Applicants respectfully request that this basis of objection be withdrawn.

35 U.S.C. § 103 Rejections

Claims **1-6** and **8-20** are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,757,645 issued to Chang, *et al.* (“CHANG”) alone. Claim **7** is rejected under 35 U.S.C. § 103(a) as being unpatentable over CHANG in view of U.S. Patent No. 5,965,306 to Mansfield, *et al.* (“MANSFIELD”). Applicants respectfully traverse each of these rejections for at least the following reasons.

Applicants note that a 35 U.S.C. § 103(a) rejection requires the examiner to first establish a *prima facie* case of obviousness. “The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.” M.P.E.P. §2142. The Court of Appeals for the Federal Circuit has set forth three elements which must be shown for *prima facie* obviousness:

First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant’s disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

As explained below, no proper modification or combination of CHANG and MANSFIELD discloses or suggests the combination of features of at least independent claims 1, 11, 16 and 19. For example:

Claim 1 recites, in pertinent part:

modifying said design data for the component according to said defect inspection data; and

analyzing said modified design data by applying a rule set to determine a final disposition of the component according to previously established criteria.

Claims 11 and 19 similarly recite, in pertinent part:

modifying said design data for said level of a mask layer according to said defect inspection data; and

analyzing said modified design data by applying a rule set to determine a final disposition of the mask according to previously established criteria.

Claim 16 similarly recites, in pertinent part:

a computer program for modifying said design data for said level of mask layer according to said defect inspection data; and

a rule set for analyzing said modified design data to determine a final disposition of the mask according to previously established criteria.

These features are not disclosed or suggested in either CHANG or MANSFIELD or any proper combination thereof.

As explained on page 4, lines 3-14, the invention is directed to a method or a system which includes modifying design data according to the defect inspection data. The modified design data is analyzed with a computer program in conjunction with a rule set to determine if a given mask defect is likely to cause product failure. For each mask layer being analyzed, the computer program reads the output from the inspection report and then identifies defects as being present on the mask according to any shapes that do not exist in the design layout data. The computer program then generates shapes corresponding to these defects. A rule set exists for each mask layer being analyzed. The rule set includes criteria for analyzing both intra- and inter-level wafer problems associated with the location, size and type (clear or opaque) of mask

defects. Finally, an industry standard design rule checking program is used to apply the rule set to determine whether to scrap, repair or accept the mask based on the current defect. When all defects have been analyzed or a scrap threshold has been reached, a decision is made as to whether any of the defects are likely to cause product failure. This is captured by the claim language.

CHANG does not relate to such a system or method. CHANG is directed to a system and method of inspecting defects on masks used to manufacture integrated circuits. As explained on col. 20, line 39 to col. 21, line 34, the system CHANG inspects a mask for defects by scanning the mask with an inspection tool 900. Defect area images for areas with possible defects are then generated with a defect area image generator 930. A defect detection processor 925 can also receive design layout data 910. The processor 925 can operate to locate the corresponding data on the design layout data for each defect area image that is generated and provide this information to an input device 955. The generator 930 provides the defect area image data to the input device 945 of a stepper image generator 940. The input device 955 receives the design layout data 910 corresponding to the defect area from the defect detection processor 925 and provides the design image simulator 960 with design data representing an area to be simulated that corresponds to the defect area being simulated. The simulator 960 then generates a simulated design stepper image 975. Finally, a defect analyzer 990 is used to compare the images 970 and 975 and to display the differences between the two so that an operator can visually detect any differences.

CHANG, however, contains no disclosure or suggestion with regard to modifying the design data for the component or for the level of a mask layer according to the defect inspection data. As explained above, the input device 955 merely receives the design layout data 910

corresponding to the defect area from the defect detection processor 925 and provides the design image simulator 960 with design data representing an area to be simulated that corresponds to the defect area being simulated, so that the simulator 960 can then generate a simulated design stepper image 975. Contrary to the Examiner's assertions, CHANG does not disclose that the design layout data 910 can be modified, much less, that the design data is modified for the component or for the level of a mask layer according to the defect inspection data.

Moreover, while it is apparent that CHANG discloses the use of a defect analyzer 1110 to indicate to a user "the status of any defect area on a mask image 1100" and that this indication can be in the form of indicators such as "accept", "reject" or "repair" (see col.22, lines 28-34), there is no disclosure or suggestion in CHANG with regard to analyzing the modified design data by applying a rule set to determine a final disposition of the component or mask according to previously established criteria. To the contrary, CHANG merely indicates that "[t]he defect analyzer 1110 generates the indicator based on an analysis of the mask image 1100 with respect to user input inspection criteria." Clearly, the generating of an indicator based on a comparison of input inspection criteria to the mask image 1100 is entirely different than analyzing the modified design data by applying a rule set to determine a final disposition of the component or mask according to previously established criteria.

MANSFIELD also does not disclose or suggest the above-noted features asserted to be missing in CHANG. While the Examiner has asserted that MANSFIELD teaches the features of dependent claim 7, this rejection is based on the assertion that CHANG discloses or suggests all of the features of claim 1, from which it depends. As this assertion has been shown to incorrect, Applicants submit that no proper combination of MANSFIELD with CHANG discloses or

suggest the features recited in claim 1, much less, those additionally recited in claim 7, which depends from claim 1.

Finally, Applicants submits that no proper modification of CHANG or combination with MANSFIELD discloses or suggests the features recited in the dependent claims such as:

- (i) that said defect inspection data comprise intensity contour plots, and the method for modifying said design data includes the following steps:
creating a simulated wafer image of the defect; and
merging said simulated wafer image into a simulated wafer image of a semiconductor chip.
- (ii) that the method for modifying said design data comprises the step of generating a representative defect shape for each mask layer being inspected corresponding to defects from said defect inspection data.
- (iii) that said rule set includes criteria for analyzing both intra-level and inter-level problems of the mask layer corresponding to said inspection defect data.

Accordingly, Applicants respectfully request reconsideration of the rejections and further request that the above-noted claims be indicated as being allowable.

CONCLUSION

In view of the foregoing amendments and remarks, Applicants submit that all of the claims are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue. The Examiner is invited to contact the undersigned at the telephone number listed below, if needed. Applicants hereby make a written conditional petition for extension of time, if required. Please charge any deficiencies in fees and credit any overpayment of fees to **IBM Deposit Account No. 09-0456** (Burlington).

Any comments or questions concerning this application can be directed to the undersigned at the telephone number given below.

Respectfully submitted,
James BRUCE, *et. al.*

A handwritten signature in black ink, appearing to be 'A. Calderon', written over a horizontal dashed line.

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